

Sick Building Syndrome

In the late 1970's, due to the world oil shortage, changes were made in building design and construction in order to save energy. As a result a number of workers in these building have experienced health problems defined as Sick Building Syndrome.

Sick Building Syndrome consists of a group of non-specific symptoms, which, according to a World Health Organisation (WHO) definition can include any of the following:

- Eye, nose or throat irritation;
- A sensation of dry mucous membranes;
- Dry skin, rash;
- Mental fatigue;
- Headaches;
- Nausea;
- Dizziness;
- Coughing;
- Hoarseness;
- Wheezing;
- Itching and unspecific hypersensitivity reactions.



“Building-associated illness”

is an overall term for health problems in buildings, separated into Sick Building Syndrome (SBS) and Building-Related Illness (BRI). BRI refers to recognised diseases that can be attributed to a building, for example, the infectious diseases, Legionnaire's Disease and Pontiac Fever, whereas SBS describes the above collection of non-specific symptoms. There can be an overlap between SBS and BRI, because SBS is frequently seen in buildings that have generated BRI's.

The most obvious way of knowing if a building is “sick”, is to look at the health of those working in it, and see if they have any of the symptoms previously listed. The term “problem buildings”, is sometimes used to avoid early classification during investigations of complaints, symptoms, diseases and/or work-related problems that cannot be clearly defined.

Other diseases that have clearly been related to building occupancy include:

- Hypersensitivity diseases such as hypersensitivity pneumonitis, humidifier fever and allergic asthma.
- Other infectious diseases such as measles.
- Toxic syndromes resulting from exposure to carbon monoxide, pesticides or microbial toxins.

Causes of Sick Building Syndrome

Air pollutants

While many people are concerned about the levels of outdoor air pollution, indoor air quality is also an important environmental factor in our lives. Infectious diseases are readily transmitted in indoor air and it has recently become clear that levels of many outdoor air pollutants are higher in apparently clean interiors. Some pollutants are unique to indoor environments.

Air pollutants in general are inhaled and so initially affect the respiratory system. They may also be absorbed through the skin and affect other organs. Some pollutants are stored in body tissues, creating the potential for adverse health effects over time. Some may affect

A study conducted by the Walter Reed Army Institute of Research in Washington, D.C. found as much as a 50 percent higher incidence of upper-respiratory problems in recruits housed in newer, more energy-efficient buildings, compared with those living in older, less airtight structures.

the eyes and some cause skin rashes and itching.

In situations where there is no clear cause for complaints or symptoms, it is often difficult to separate environmentally caused symptoms from those created by suggestion, or those that are the result of stress. Poor air quality is a general stressor. It can trigger complex changes in mood and motivation and create problems in interpersonal relations.

A large majority of indoor furnishings and activities produce particulates or gas of some kind. For example:

- When a building is new, some compounds are given off quickly and soon disappear, others continue “off-gassing” at a slow pace for years.
- Photocopiers give off ozone and there have been reports of formaldehyde being released from bulk paper stores.
- People shed millions of particles, mainly skin scales, every minute. Many of these scales carry microbes, but the majority of these microbes are short-lived and harmless.
- Clothing, furnishings, draperies and carpets all contribute fibres and other fragments to the atmosphere. Cleaning processes such as sweeping, vacuuming and dusting normally remove the larger particles, but often increase the airborne concentrations of smaller particles.
- Cooking, boiling, grilling, gas and oil burning, smoking, coal and wood fires all also generate vast numbers of airborne particulates as well as vapours and gases.

Ventilation

Studies have shown that poor ventilation is a major factor in most problem buildings. The United States National Institute for Occupational Safety and Health (NIOSH) has found that over 50% of “sick buildings” suffer from inadequate ventilation. Poor ventilation can be caused by a number of factors, including:

- **Insufficient outside air entering the system.** Outside air dilutes the concentration of indoor pollutants. Opening a window as a solution is impossible in most modern buildings and impractical when there are climatic extremes.
- **Poor filtration.** Air must be continually cleaned and purified to keep it safe and healthy to breathe. Filters that are mainly designed to stop birds and insects from entering do not filter out smaller particles that can be unhealthy. Filters that do not fit properly and allow air to flow unfiltered around them, or filters that are not properly maintained, will also prove ineffective.
- **Dirty air handling units.** All air handling units

Examples of Indoor Air Pollutants	
Gases and vapours (organic and inorganic)	Radon, Formaldehyde, Sulphur Dioxide, Carbon Monoxide, Carbon Dioxide
Fibres	Asbestos, Synthetic Fibres, Fibrous Glass, Textiles/Cotton
Dusts	Household dust which contains allergens such as mites, pollens and spores. Smoke/fume particles from coal, wood and tobacco.
Microbes	Bacteria, protozoans, fungi, viruses

get dirty over time. They are composed of many mechanical parts, reservoirs and often kilometres of twisting ductwork, which can collect dirt, dust and other grime. This provides a perfect breeding ground for bacteria, moulds and fungi, which thrive on dirt and dark and damp conditions.

- **Contaminated ductwork.** Ductwork can become contaminated well before a building is occupied, by being used as a dump for construction debris and trash. Ductwork is largely ignored because it cannot be seen - “out of sight, out of mind”.
- **Poor planning.** Mistakes are often made during remodelling or refurbishing of offices when ventilation requirements are not correctly balanced with changes in staffing densities.

What can be done?

Building owners, developers, architects, government officials, employers, building managers, unions and individual employees, must work together to provide a clean, wholesome indoor environment for all office workers.

Consulting an occupational hygienist or ventilation engineer familiar with indoor air quality problems



could help prevent potential problems from occurring. Maintaining good indoor air quality should be a high priority in airconditioned office environments. Higher standards of hygiene need to be employed; filtration systems could be upgraded, regularly serviced and well maintained.

It is not unusual for people suffering from irritated eyes, sore throats or headaches to blame the symptoms on tobacco smoke. If an individual sees tobacco smoke accumulation, they are only seeing one symptom of a larger problem. Smoking bans or restrictions will only

be efficient if they are part of a total clean air policy.

Experience teaches us that an early response to “sick building” symptoms will go a long way in rectifying the problem. This can often be done with only modest increases in operating costs. In many buildings, ventilation rates may be the problem. The relevant Australian Standards for ventilation rates were set in 1980, before current changes in design and construction. Some experts believe that air supply levels need to be much greater than these levels.

For further information and advice contact the Workers Health Centre



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